

Notice of Allowability

Application No.

09/938,072

Examiner

Eric Hug

Applicant(s)

FOTHERINGHAM ET AL.

Art Unit

1731

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed on May 6, 2004.
2. ☒ The allowed claim(s) is/are 1,3,5,7-11 and 19-23.
3. ☒ The drawings filed on 23 August 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John Hoffman on May 27, 2004.

The application has been amended as follows:

Claim 1 (currently amended): A method for ceramizing starting glass of glass-ceramics into glass-ceramics, comprising at least the following steps:

heating the starting glass from an initial temperature T_1 to a temperature T_2 which is disposed above the glass transformation temperature T_G at which crystallization nuclei are precipitated;

holding the glass at the temperature T_2 for a period t_2 for the precipitation of crystallization nuclei;

further heating the glass to a temperature T_3 at which a crystal phase grows on the nuclei formed following the preceding steps;

holding the glass for a period t_3 at a temperature T_3 or heating during this period to a higher temperature T_4 until predetermined properties of the glass-ceramics have been reached; and

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controlling ~~the~~ a temperature curve relating to the glass temperature with the help of a control loop comprising at least one temperature sensor for sensing the temperature and a heating unit as an actuator, wherein

the heating unit comprises short-wave IR radiators that heat the glass to be relaxed with a thermal dead time of less than 10 secs. and the heating unit IR radiators are of a high color temperature $>1,500^{\circ}\text{C}$., wherein the IR radiators of the heating unit comprise an IR radiation cavity defining a bordered space having at least one of reflective and backscattering boundary surfaces.

Claim 7 (currently amended): A method as claimed in claim 1, wherein the heating temperature time to temperature T_2 is less than 120 secs., ~~preferably less than 90 secs.~~, and the temperature T_2 is less than 800°C .

Claim 8 (currently amended): A method as claimed in claim 1, wherein the holding temperature period t_2 at temperature T_2 is in the range of 60 secs. to 3,600 secs.

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Claim 10 (^{currently amended} ~~previously presented~~): A method as claimed in claim 1, characterized in that the holding temperature period t_3 at temperature T_3 and the heating time t_3 to temperature T_4 is in the range of 60 secs. to 1,800 secs.

Claim 12 (canceled).

Claim 13 (canceled).

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Claim 14 (canceled).

Claim 16 (canceled).

Claim 18 (canceled).

Allowable Subject Matter

Claims 1, 3, 5, 7-11, and 19-23 are allowed.

The prior art does not disclose or suggest a method for ceramizing glass into glass-ceramics according to the heating and holding steps of the claimed temperature curve utilizing infrared radiators of color temperature $>1,500^{\circ}\text{C}$ and an infrared cavity having reflective or backscattering boundary surfaces. The prior art teaches temperature curves for ceramizing glass using electric heating devices (Gaskell et al). The prior art also teaches using localized short-wave infrared radiation for ceramizing glass (Jagodzinski) or tempering glass (Spanoudis), whereby the radiation is of high intensity and focused on selected portions of a glass substrate. Any combination of prior art teachings or suggestions therefrom do not result in the claimed invention.

Response to Arguments

Applicant's amendments to the claims and corresponding arguments have overcome the rejections set forth previously.

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Risse (US 4,208,573) discloses a short-wave infrared radiation heated kiln with a plurality of radiators and internal reflectors for uniformly heating dental material.

Deschamps et al (US 6,513,347) discloses an evacuated infrared radiation heating chamber with reflective surfaces for heating flat glass panels up to 200°C.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Hug whose telephone number is 571 272-1192. The examiner can normally be reached on Monday through Friday, 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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